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555,197

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PROVISIONAL SPECIFICATION

Improvements in or relating to Liquid Delivery Devices

We, NON-DRIFF MEASURE COMPANY LIMITED, a British Company, and ALBERT GEORGE BERWICK, a British Subject, both of Ellison Works, Danbrook Road, Streatham, London, S.W.16, do hereby declare the nature of this invention to be as follows:—

This invention relates to devices for delivering liquids and has for its object to provide an improved construction or arrangement designed to enable bottles or other small containers to be rapidly filled from a larger container, to diminish the loss of liquid by spilling and to avoid the formation of drips in the delivery nozzle.

According to the invention the improved delivery device includes an outlet valve adapted to be actuated by upward pressure exerted by the receptacle to be filled and provided with means for varying the outlet port area according to the viscosity of the liquid being delivered.

In carrying the invention into effect and in the preferred manner, the liquid delivery device comprises a delivery chamber in the base of which is a valve controlled outlet. This outlet is normally closed by a valve member in the form of a hollow stem closed at its upper end and having lateral ports near its upper end communicating with the hollow portion. This valve member has a head of larger diameter than the stem and whose lower annular surface is fitted with sealing means adapted to engage co-operating means in the base of the delivery chamber to form a fluid tight seal when the device is at rest.

The push up valve stem is slidable within a sleeve or housing depending from the base of the delivery chamber and within this housing is disposed an annular resilient disc whose inner edge makes wiping contact with the surface of the stem to prevent liquid leaking down the sides of the stem. Within the said housing is also disposed a spring for returning the stem to normal position after operation, the lower end of this spring bearing upon a collar or sleeve fixed to the stem. Near the lower end of the stem and externally of the housing, the stem is formed with a screw

threaded portion on which is mounted an adjustable nut or nuts, variation in the position of which varies the length of the operative stroke of the stem, the upper limit of which is determined by the said nut abutting against the lower end of the housing. By varying the operative stroke in this manner, the degree of opening of the aforesaid ports is varied so that they can be caused to open to their fullest extent when liquids in the nature of syrups are being delivered and to a lesser extent to deal with more freely flowing liquids such as water or spirit.

The lower end of the stem terminates in a delivery nozzle shaped to enter the neck of the receptacle to be filled and having an annular shoulder adapted to rest upon the top of the bottle neck, the said annular shoulder being grooved, fluted or otherwise formed to allow escape of air from the bottle.

In operation, a bottle is held over the said nozzle and upward pressure exerted moving the stem upwards and allowing the liquid to pass through it into the bottle. When filled, the bottle is removed and the supply of liquid is automatically and immediately cut off.

The device above described is capable of application to containers of all kinds including bottles, casks and tanks. In the application to bottles, an air tube is provided communicating between an air inlet in the head of the delivery chamber and the base of the bottle which is inverted to enable its contents to be withdrawn. The air inlet is provided with a closure device to prevent escape of liquid while the bottle is being inverted. Where the device is applied to the outlet from a tank or the like which is open to atmosphere no air inlet tube is needed.

For attachment to a cask the head of the delivery chamber is secured to a spigot formed with a right-angled passage and having a screw-down valve which can be used to shut off the supply of liquid from the cask when the delivery device is to be removed for cleansing or repair.

The device according to the invention is also applicable for connection to a supply pipe through which liquid flows by gravity

or under pressure.

When the delivery device is made in larger sizes capable of being operated by the pressure exerted through the rim of a tumbler or like receptacle, the lower end of the stem may be provided with laterally extending arms and may also be provided with a drip prevention device of the kind described in prior Patent No. 455,271.

The invention can also be applied to devices for delivering measured quantities of liquid of the kind described in prior Patent No. 455,266 or 532,530.

Dated this 4th day of November, 1941.

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COMPLETE SPECIFICATION

Improvements in or relating to Liquid Delivery Devices

We, NON-DRIP MEASURE COMPANY LIMITED, a British Company, and ALBERT GEORGE BERWICK, a British Subject, both of Ellison Works, Danbrook Road, Streatham, London, S.W.16, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to devices for delivering liquids such as medical or perfumery preparations to bottles and the like and more particularly to the type which comprises a housing adapted to be in permanent communication with the source of liquid supply, a hollow stem axially movable in said housing by means of upward pressure applied through the receptacle to be filled, a valve member mounted upon said stem adapted to be actuated by such axial movement to allow liquid to discharge through the hollow stem and a spring compressed by movement of said stem and by which the return movement of the stem is effected upon removal of the filled receptacle.

The object of the present invention is to provide an improved construction of the type above described designed to enable the operation of filling a bottle or container to be performed with one hand whilst preventing loss of liquid during changeover of the bottles.

The invention consists in a device of the type above referred to for delivering liquids comprising in combination means for setting the extent of the operative movement of the hollow delivery member to suit the viscosity and/or the rate of flow of the liquid being delivered and flexible means operated by the downward movement of the hollow delivery member to secure the retention of liquid within the hollow delivery member on completion of delivery.

Where the invention is applied to the filling of bottles or other containers having a pouring lip, escape of air can take place during filling but to deal with bottles and the like not so provided the in-

vention also includes the positioning at the delivery end of the axially movable member of means to permit the escape of air from the receptacle being filled.

Reference will now be made to the accompanying drawings which illustrate a liquid delivery device constructed according to the invention and in which:—

Fig. 1 is a sectional elevation with the parts in the closed positions.

Fig. 2 is a sectional elevation similar to Fig. 1 but with the valve open for delivery of liquid.

Fig. 3 is a sectional plan taken on the line 3—3 of Fig. 2.

Fig. 4 is a detail view of the movable valve stem.

Fig. 5 is a view showing the component parts of the device after dismantling and

Fig. 6 is an outside elevation of the delivery device to a smaller scale showing its application to a spigot.

In the construction illustrated and referring first to Fig. 1, the liquid delivery device comprises a chamber 1 which may be of glass or other transparent material and in the base of which is movably mounted a delivery member which includes a cylindrical stem 3 having a passage 4 extending throughout the major portion of its length and terminating at its upper end in radial ports 5. The delivery member carries a head 6 of larger diameter than the stem 3 detachably mounted upon a screw-threaded upper terminal portion 7 of the stem. The lower annular surface of the head 6 is fitted with a sealing ring 8 which is retained in place when the head 6 is screwed into operative position by partial engagement with a shoulder 9 formed by the upper end of the cylindrical portion of the stem 3. The sealing ring 8 which is preferably made of India rubber, synthetic rubber or other yieldable material engages over a seating formed by the upper inner edge 2 of a sleeve within which the stem 3 is slidable, the said edge 2 being formed as a sharp edge by a bevelled channel 10 around it. In this manner a fluid tight seal is formed at the base of the chamber 1 when the device is

in the at-rest position shown in Fig. 1.

The sleeve 11 is externally screw-threaded and is provided with a flanged head 12 carrying a sealing ring 13 on its under surface adapted to bear upon the turned lower end 14 of the chamber 1, the sealing ring 13 being compressed to ensure a fluid tight joint by means of a hood 15 which is screw-threaded on to the sleeve 11 until the upper surface of the hood makes frictional binding engagement with the base of the chamber 1. The sleeve 11 and hood 15 co-operate to form an annular chamber surrounding the movable stem 3 and in the upper end of this chamber is disposed an annular resilient disc 16 whose inner edge makes contact with the surface of the stem 3 to prevent liquid leaking down the surface of the stem. The outer portion of the disc 16 is held between a shoulder at the lower end of sleeve 11 and a ring 17, the internal surface of both shoulder and ring being bevelled to allow flexing movements of the ring 16 to take place as the stem 3 is moved. Against the lower surface of the ring 17 bears a spring 18 whose lower end abuts against a flanged collar 19 whose outer surface is slidable within the hood 15 and whose base rests upon a boss 20 formed integral with the stem 3 near the base thereof. This boss 20 is externally screw-threaded and carries a pair of adjustable nuts 21 and 22 one of which serves as a lock-nut and the upper one of which determines by its position the amount of travel of the stem 3 and the extent of opening permitted to the ports 5, the upward movement of the stem being limited by the upper surface of nut 21 abutting against the lower end of the hood 15. The lower end of the stem 3 terminates in a nozzle 23 which is adapted to enter the neck of the receptacle to be filled and which is, for example, a bottle as indicated by the broken lines 24 in Figs. 1 and 2. To allow escape of air from the bottle, two opposed sides of the nozzle 23 are formed with flats at 25 so that the nozzle does not entirely fill the neck of the bottle and two flats or grooves 42 are formed across the undersurface of the boss 20 so that the top of the bottle does not make contact with the said boss over the whole of its lower surface.

The upper end of the chamber 1 is formed with a flange 26 which is held in engagement with a cover plate 27 carrying a sealing ring 28 by a securing ring 29 having an inwardly directed flange 30 which engages beneath the flange 26 and which is screw-threaded as shown to engage the cover plate 27. The cover plate 27 is formed with a head 31 within which is mounted a tubular inlet 32 capable of attachment to a tank or storage receptacle

from which the supplies of liquid are withdrawn as the operation of the stem 3 takes place. In operation, the bottle or like receptacle to be filled is held over the nozzle 23 and upward pressure is exerted moving the stem 3 upwards until its progress is arrested by the nut 21 abutting against the lower end of the hood 15. With the parts in the positions of adjustment shown in Fig. 1 the maximum amount of movement possible is indicated in Fig. 2 wherein the stem 3 is moved upwards sufficiently to lift the ports 5 partially above the level of the head 12 forming the base of the chamber 1, so that liquid can flow out of the said chamber through ports 5 and passage 4 into the bottle 24, the air displaced during this operation escaping through the channels formed by the flats 25 and 42. Immediately the upward pressure is relaxed by removal of the charged bottle, the spring 18 which is compressed by the delivery operation is free to expand and restore the parts to the positions shown in Fig. 1 in which the base of the chamber 1 is sealed against escape of further liquid by the engagement of the ring 8 with the edge 2 on the sleeve 11. Throughout these operations the ring 16 operates to prevent any liquid leaking down the surface of the stem 3 and any liquid accumulating in this way can escape into the ports 5 by way of a slight enlargement 41 of the inner wall of sleeve 11 which surrounds the ports 5 in the rest position. A further function of the ring 16 is that during the return of the stem 3 to the inoperative position, the ring is drawn downwardly with the stem exerting sufficient suction through the space 41 and ports 5 to cause retention of liquid within the delivery member 3 after the ring 8 engages its seating 2. The close contact between the ring 16 and stem 3 in conjunction with the sealing action of the ring 8 retains the liquid within the passage 4 and prevents dripping of liquid from the passage 4 while the device is inoperative.

By varying the position of the nuts 21 and 22 the degree of opening of the ports 5 can be varied so that they can be caused to open to their fullest extent when liquids in the form of syrups are being delivered and to a lesser extent to deal with more freely flowing liquids such as water or spirit. The adjustment of the degree of opening of the ports 5 also gives control of the speed at which any type of liquid can be delivered. For example, where very small containers have to be filled with a viscous liquid, it may not always be desirable to have the ports 5 open to their fullest extent as the rate of flow could be such as to overflow too readily from the container being filled.

In Fig. 5 the component parts of the chamber 1 and stem 3 are shown dis-

mantled for cleaning, the stem 3 with its head 6, spring 18 and collar 19 being removable as a unit as shown. By holding the sleeve 11 and reciprocating the stem 3 the ports 5 and passage 4 can be thoroughly cleansed. Further dismantling, however, can be very simply effected and the stem in its completely dismantled condition is shown in outside elevation in Fig. 4.

10 The device above described is capable of application to containers of all kinds including bottles, casks and tanks. When the inlet 32 is provided with means for fixing it in the neck of an inverted bottle, an air tube may also be provided to communicate between an air inlet in the head 31 of the delivery chamber and the base of the bottle, such air inlet being provided with a closure device to prevent escape of liquid while the bottle is being inverted. Where a device according to the invention is applied to the outlet from a tank or the like which is open to atmosphere, either partially or wholly, no air inlet tube is needed. Also the valve housing constituted by the sleeve 11, hood 15 and collar 19 containing the stem 3 and its associated parts can be affixed to the base of a tank or the like without the necessity for the delivery chamber 1.

The means for attaching a device of the kind shown in Fig. 1 to a cask is shown in Fig. 6 wherein the delivery tube 32 is secured into a socket 33 forming part of a spigot 34 whose tapered end is screw-threaded as shown at 35. Through the passage within the spigot passes the stem 36 of a valve 37 adapted to close the inner end of the spigot passage 38. When a knob 39 attached to the outer end of the stem 36 is rotated the screw-threaded portion 40 of the said stem causes axial movement of the stem and valve member 37 to take place so that the supply of liquid from the cask can be shut off when the delivery device is to be removed for cleansing or repair.

The device according to the invention is also applicable for connection to a supply pipe through which liquid flows by gravity or under pressure.

The delivery device, particularly when made in larger sizes may be provided at the lower end of the stem with laterally extending arms and may also be provided with a drip prevention device of the kind described in prior Patent No. 455,271.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A device of the type referred to for delivering liquids comprising in combination means for setting the extent of the

operative movement of the hollow delivery member to suit the viscosity and/or the rate of flow of the liquid being delivered and flexible means operated by the downward movement of the hollow delivery member to secure the retention of liquid within the hollow delivery member on completion of delivery.

2. A device for delivering liquids according to Claim 1 wherein means are positioned at the delivery end of the axially movable member to permit the escape of air from the receptacle being filled.

3. A device for delivering liquids according to Claim 1 or 2 wherein the delivery member comprises a hollow ported cylindrical stem the upper end of the said stem carrying a valve member consisting of a head of larger diameter than the stem and formed or provided on its under surface with means for making sealing engagement with a seating when the valve member is in the closed position.

4. A device for delivering liquids according to Claim 3 wherein the axially movable delivery member carries a nut or nuts adapted to abut against the lower end of the housing or an extension thereof when the said delivery member is pushed upwards, the position of the said nut or nuts being adjustable to vary the travel of the delivery member.

5. A device for delivering liquids according to Claim 3 or 4 wherein the lower portion of the housing or an extension thereof is of enlarged diameter to accommodate a flexible ring whose outer edge is fixed and whose inner edge makes contact with the surface of the axially movable delivery member to cause suction to retain liquid within the said delivery member after discharge has been completed.

6. A device for delivering liquids according to Claim 5 wherein the housing or its extension is adapted to accommodate a spring arranged to return the delivery mechanism to the closed position when the upward pressure is relaxed.

7. A device for delivering liquids according to Claim 2 wherein the lower part of the axially movable member is formed with a flange or boss having grooves therein or flats thereon to provide passages for the escape of air from the container during the filling operation.

8. A device for delivering liquids according to any of the preceding claims wherein the ported upper end of the axially movable delivery member is adapted when operated to enter a delivery chamber detachably connected to a cover formed or provided with means for attachment to the base of a tank, bottle or other

receptacle from which supplies of liquid are to be withdrawn.

9. A device for delivering liquids comprising a housing adapted to be connected to a receptacle for liquid, a cylindrical stem movably mounted in said housing, an axial outlet channel formed in said stem and adapted to communicate through ports with the interior of a delivery chamber or other receptacle to receive liquid when the stem is operated by upward pressure of the receptacle to be filled, a valve member carried by the stem for making sealing engagement with a seating, means mounted in said housing and making contact with said stem to cause suction to re-
- tain liquid within said stem when the valve is seated, a spring adapted to return said stem to closed position when the upward pressure thereon is relaxed and adjustable means carried by said stem for varying its operative stroke and the extent of port opening.
10. A device for delivering liquids constructed, arranged and adapted to operate as herein described with reference to the accompanying drawings.

Dated this 4th day of November, 1942.

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London, E.C.4.

[This Drawing is a reproduction of the Original on a reduced scale.]

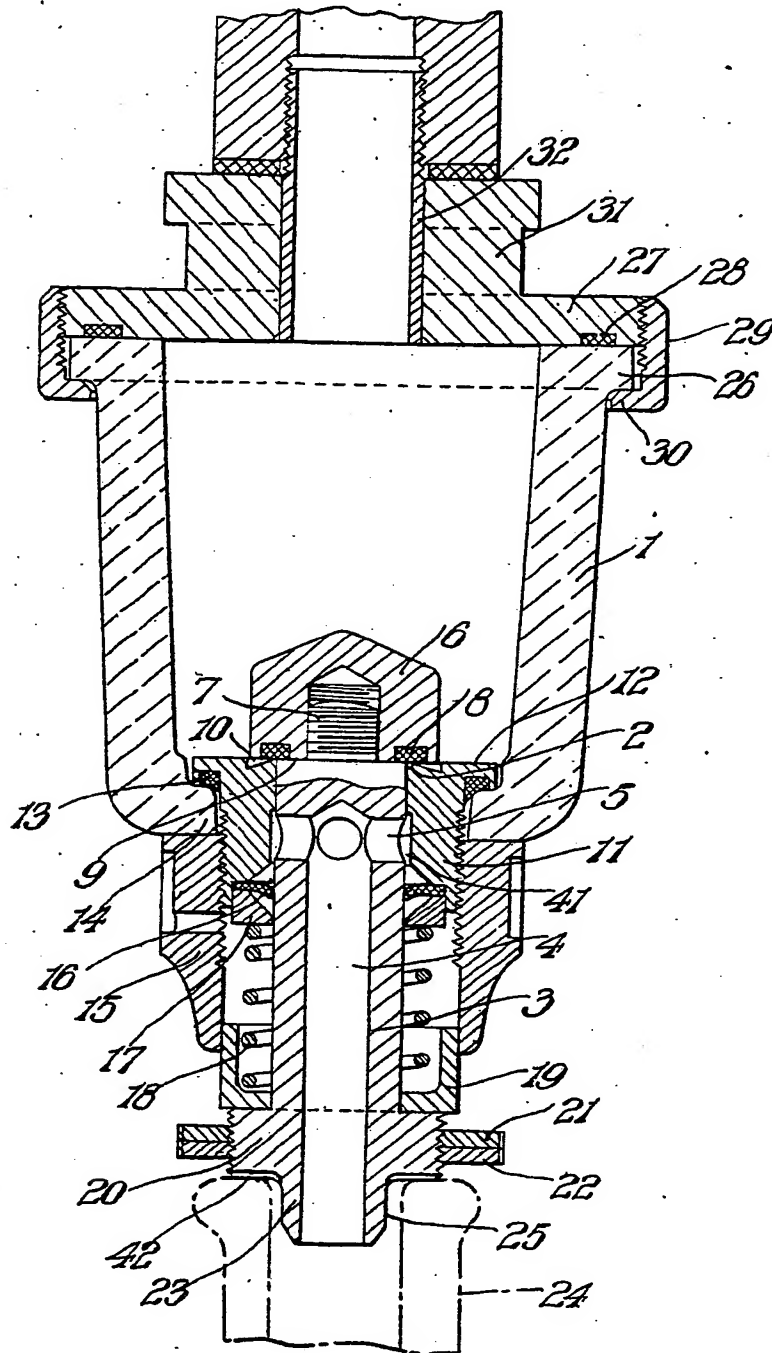


Fig. 1.



Fig. 4.

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SHEET

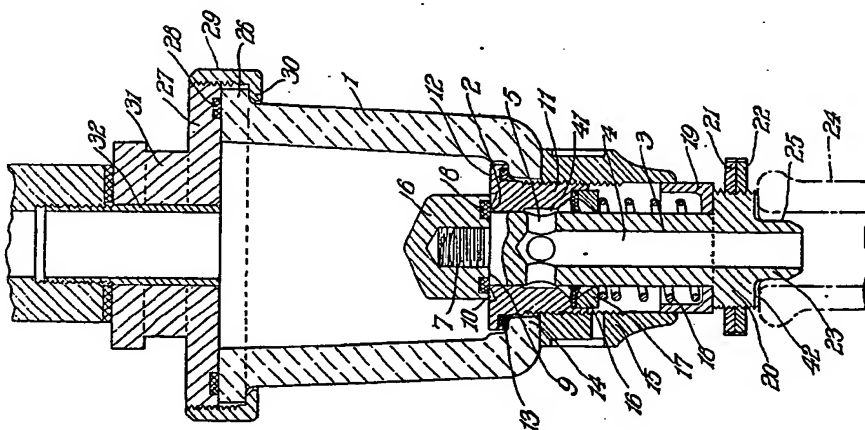


Fig. 1

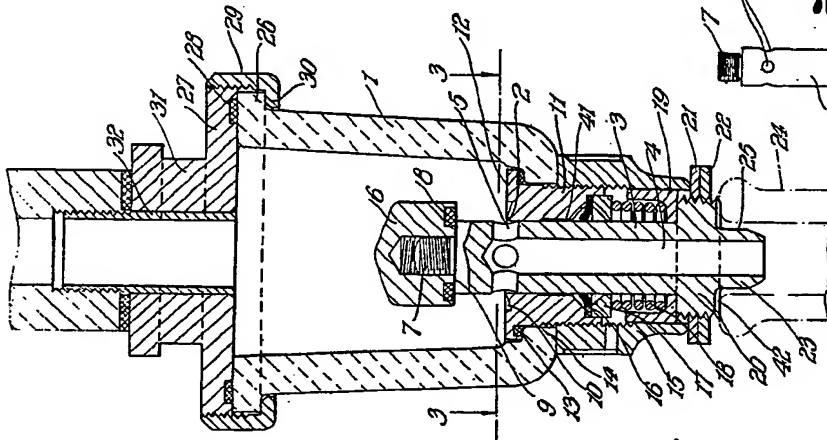


Fig. 2

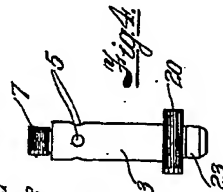


Fig. 3

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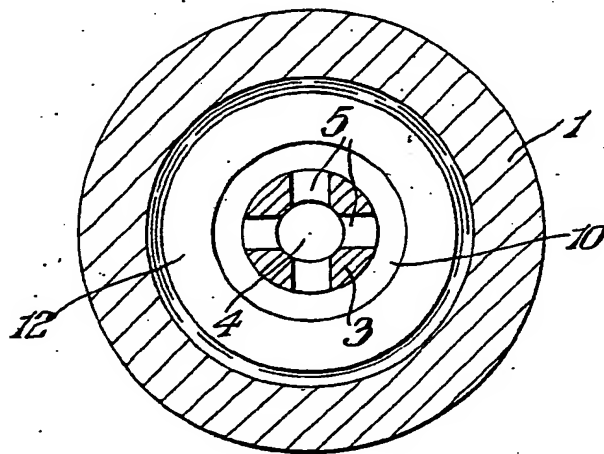


Fig. 3.

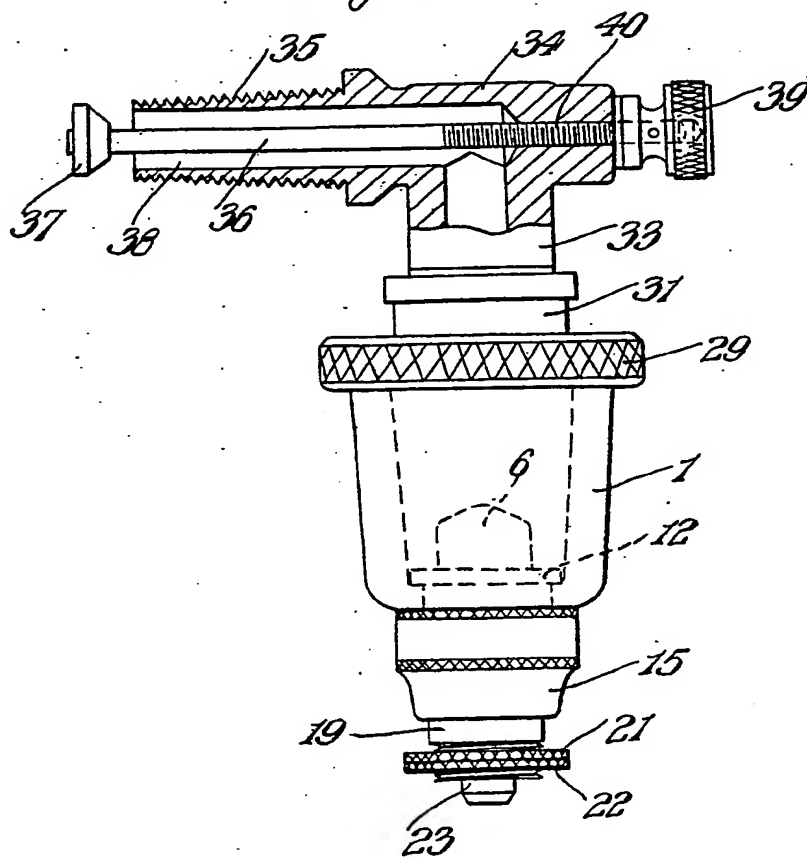
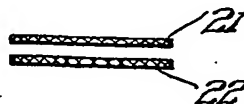
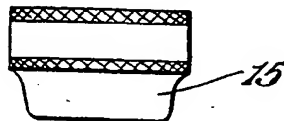
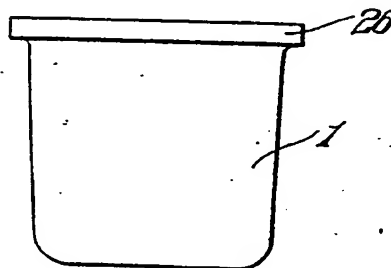
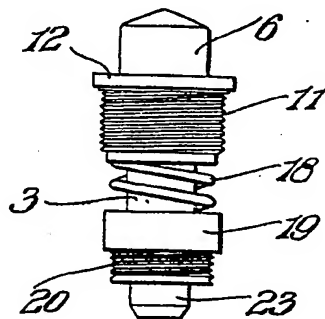
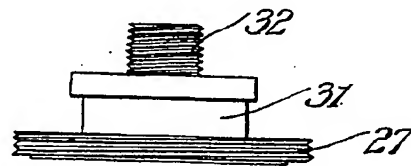
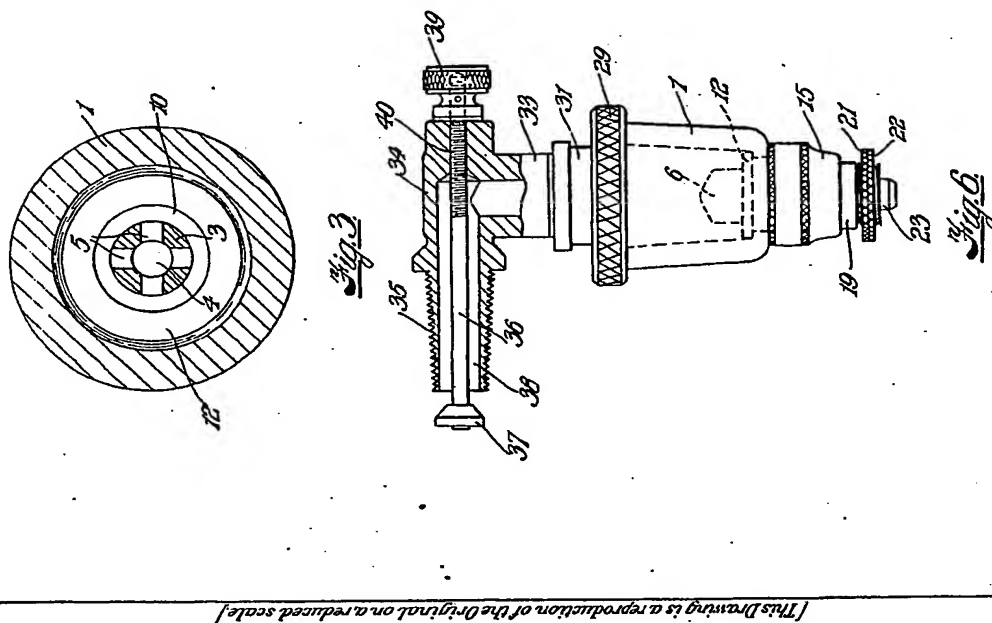


Fig. 6.

*Fig. 5.*



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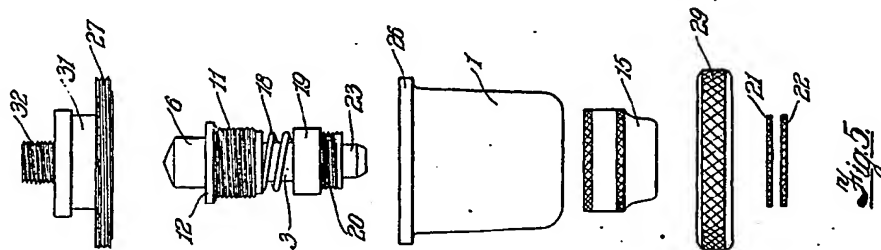


Fig. 5.

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